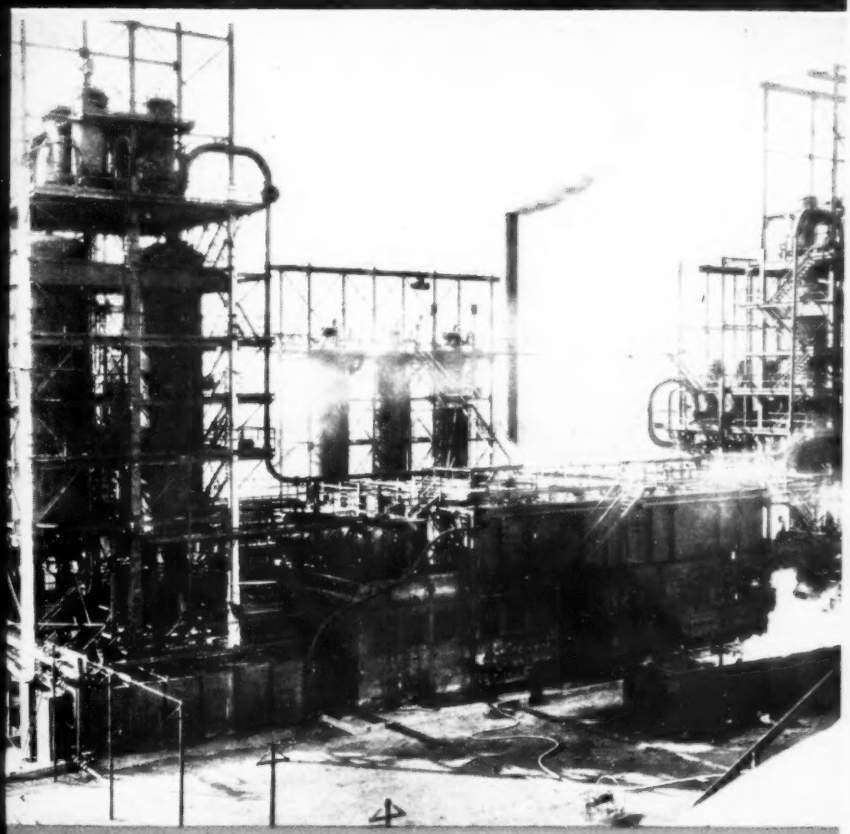
Occupational HAZARDS

NOVEMBER 1939

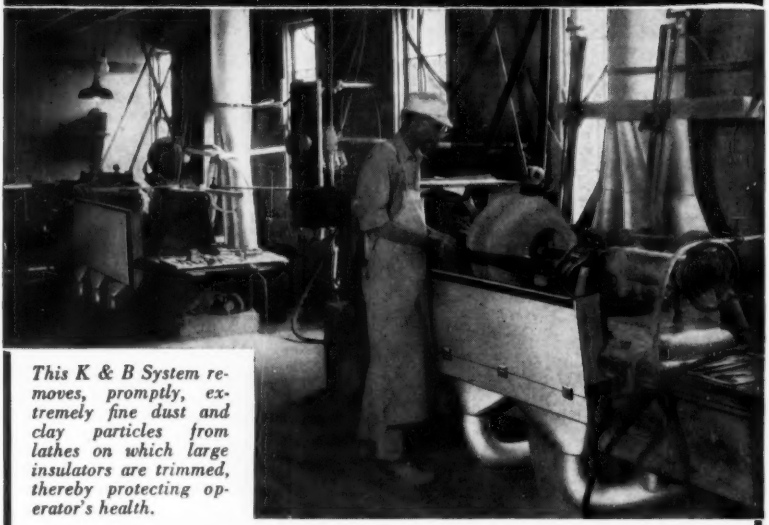


There's Profit in Prevention

KIRK & BLUM

DUST AND FUME CONTROL

ENGINEERS AND CONTRACTORS



This K & B System removes, promptly, extremely fine dust and clay particles from lathes on which large insulators are trimmed, thereby protecting operator's health.

BETTER DUST CONTROL

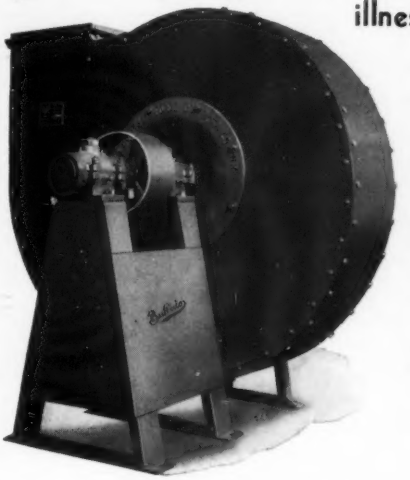
- Protects workmen against occupational hazards and diseases.
- Provides a clean plant—improves working conditions and morale.
- Increases production; insures a better product.
- Reduces repairs and maintenance on machines, bearings and motors.
- Saves on insurance rates.

KIRK & BLUM Dust Collecting Systems—designed, engineered and erected to meet the specific requirements of each installation—assure these advantages with utmost efficiency and economy of operation. They soon pay for themselves. Write for details and interesting illustrated book.

THE KIRK & BLUM MFG. COMPANY - 2802 Spring Grove Avenue, Cincinnati, Ohio

Chicago Representative: C. P. Guion, 1661 N. Milwaukee
Pittsburgh: The Bushnell Mchy. Co., 311 Ross Street
Louisville: Liberty Eng. & Mfg. Co., Inc., 1450 S. 15th St.

KEEP THIS PICKPOCKET OUT OF YOUR PLANT



Dust steals profits. It slows up production, can cause serious illness, and otherwise reduces the efficiency of workers. You can keep this "pickpocket" out of your plant by installing Buffalo Standard Reversible Steel-Plate Exhausters wherever you have an operation that causes dust. Sizes for every need. Prompt shipments from stock. Write us now for Bulletin 2678-B.

BUFFALO FORGE COMPANY

191 Mortimer St. Buffalo, N.Y.
Branch Engineering Offices in Principal Cities
Canadian Blower & Forge Co. Ltd., Kitchener, Ont.

The publications briefly described in this service department are prepared by manufacturers' technical experts. The data they contain on equipment supplies and prevention methods applies to varied phases of occupational hazard problems. Note those items desired on coupon below and send to Occupational Hazards, 812 Huron Rd., Cleveland, Ohio.

196—SAFETY FLOOR WAX
A new illustrated booklet describing the qualities a floor wax needs to meet the requirements of safety, appearance, and protection of floor surface. The booklet also shows ways to test the water resistance and slipperiness of a wax, and contains charts showing the costs of floor maintenance.

197—PORTABLE ELECTRIC HAMMERS
The Van Dorn Electric Tool Co. announces a comprehensive new illustrated book discussing various phases of electric hammer use.

198—PROTECTIVE DEVICES FOR LOW-VOLTAGE POWER CIRCUITS
A liberally illustrated book, annotated with charts and tables, describes how to select proper protective devices for low-voltage power circuits, and to guard against short circuits. The book, which is issued by General Electric, shows a number of installations of circuit breakers.

199—CATALOGUE OF PERSONAL PROTECTIVE DEVICES
Willson Products, Inc. have issued a comprehensive catalogue showing their line of goggles, face shields, respirators, etc., and including a variety of personal protective devices.

200—FACE SHIELDS
A brochure illustrating and describing an extensive line of face shields for all purposes is offered by the Boyer-Campbell Company Advertisement on page 4.

201—PRECAUTIONS AGAINST FREEZING OF FIRE EXTINGUISHING APPLIANCES
An exhaustive discussion, together with tables for standard procedures, of proper care of fire extinguishing equipment in cold weather is available from the National Fire Protection Association.

202—POTENTIOMETER-TYPE PYROMETER
For measuring industrial temperatures with laboratory precision, and with a maximum of freedom from contact with heat, noxious gases, or other hazards. The book describing the Optical Pyrometer should be of interest to all who work with high temperatures.

203—FOOT SAFETY PLAN
Safety shoes, a plan of encouraging employees to wear safety shoes, and a catalogue of Thom McAn safety shoes are contained in the illustrated booklet now available.

204—COMPRESSED AIR
Catalogue of devices for safe and efficient handling of compressed air in industry is offered by A. Schrader's Son.

205—PROTECTIVE CREAM
Literature describing Stover's Protective Cream, a special preparation for curbing industrial dermatitis, is available. The cream, which is antiseptic, is intended for use, among others, in the cement, chemical, oil, paint, foundry, and fertilizer fields.

FREE LITERATURE COUPON
Clip out and paste on postcard or enclose in envelope.

Nos. of desired items .....

Firm Name .....

Your Name ..... Position .....

Street and Number of Your Firm .....

City ..... State .....

FL-14

THE WISCONSIN INDUSTRIAL COMMISSION (which has done an outstanding job of collecting and reporting statistics) tells us that in 1938 they settled 725 eye injury cases, compensation paid being $426,376. Which figures out $588 per case as compared with $230 for the average of all compensation payments. Further, the eye accidents were responsible for an average of 190 days lost time per case, as contrasted with 97 days per case for all injuries. All of which looks to us as though we ought to take stock of this eye situation. Injuries to eyes are one of the most responsive-to-preventive-measures of all occupational hazards. Protective devices *can* prevent these extremely expensive and avoidable cases—why do we continue to let them happen?

WE HEAR a lot about "discipline" in the prevention and control of occupational hazards. Sometimes we wonder whether we all have the right slant on this "discipline" business. Many writers and speakers talk of "discipline" as punishment for breaking rules. We "discipline" a worker for carelessness by scolding him, by firing him—just as we "discipline" a criminal by throwing him in jail. We can't help feeling that the real virtue of "discipline" in preventing occupational disease is in the "disciplined state of mind." It's not a punative problem—it's preventive. "Discipline" should mean mental and emotional control, straight thinking, freedom from the sloppy state of mind that permits injuries to happen. Let's forget about punative discipline, and get to work on a really disciplined state of mind.

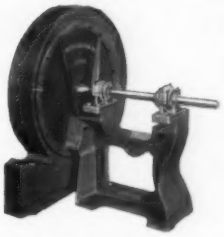
WE HAVE a letter from an industrial hygienist reader who wants to know "have you any information on the occupational hazard aspects of noise in industry? Has noise been proven to be deleterious? What preventive measures are available?" In answer to which we say that we have been investigating this field, and expect to run one or more editorial features on the hazardous nature of noise in industry in the next few months.

THE AMERICAN STANDARDS ASSOCIATION has just announced approval of the Manual of Accident Prevention developed by the Associated General Contractors of America. The Contractors' Association estimate that at least half the accidents in construction could be avoided, and that the monetary saving would approach $200,000,000 per year, could this be accomplished.

WE'RE INTRIGUED, this month, with contemplation of something the size of 1/3000th of a hair's breadth. Can you visualize it? Neither can we, but you'll probably be interested to know that the Timken Bearing people have a machine called the "prolifograph" in their Canton plant that measures things down to the 1,000,000th part of an inch. You guessed it—that's 1/3000th of a hair!

OUT-ON-A-LIMB DEPARTMENT. We'd like to make a prediction (along with a couple of other smart people we know) that we're going to hear a lot, before long, about fatigue as an occupational hazard. And about the diseased condition it encourages. We aren't making any promises—we just think some rather surprising information will be forthcoming.

Let Us Solve Your Air Problem



The right fan or blower helps

Mfrs. Since 1879

GARDEN CITY FAN CO.
McCORMICK BLDG. CHICAGO

Protectors In Standard Safety Code

This is the seventh in the series of recommended protectors as set forth in the revised copy of "The American Standard Code for the Protection of Head, Eyes and Respiratory Organs."

Hose Mask

General—These respirators shall be constructed in all their parts of materials obviously suitable for the purpose they are to serve. This applies to the fabric, rubber, metal, and other parts. All rubber parts that come into contact with the skin shall be of a nonirritating composition. Rubber, except that used for the hose, shall meet the requirements of rule 156. The rubber and metal parts shall withstand sterilization as specified in rule 140.

Parts—The hose mask shall comprise a facepiece with head harness, inhalation and exhalation valves, and one or more breathing tubes. The breathing tube shall connect to a hose supported by the body harness, and reaching to an intake of respirable air. A hand-operated blower may or may not be connected to the supply end of the hose. For emergency work, a hand-operated blower is mandatory.

Facepiece—The facepiece shall be designed to permit inhalation through the nose, in event that a blower is not operated, without leakage of irrespirable gases. Only full or Tissot types, which form a pocket over the face and allow breathing through the nose, are permissible. No device with a direct mouth or nose connection is permitted. Elastic headbands shall be adjustable and replaceable. In devices where the windows or lenses are required to give protection to the eyes, as from flying particles, splashing of molten metal, or harmful light, they shall be of a type that meet the requirements for goggles or other protectors for similar hazards.

The distribution and velocity of the air within the facepiece shall be such as not to cause discomfort to the wearer. The head harness may consist of elastic headbands which are adjustable and replaceable. The exhalation valve shall be guarded to prevent distortion or injury.

Breathing Tubes—One or two flexible rubber breathing tubes of the nonkinking type shall extend from the facepiece to a connecting hose coupling attached to the belt or body harness to conduct air from the hose to the facepiece. These tubes shall permit free head movement while the device is being worn.

The supply hose shall not exceed 150 ft. (46 m.) in length and shall meet the test requirements of the U.S.B. of M.

The resistance to inhalation shall not exceed 2.5 in. (63.5 mm.) of water-column height to air flowing at a rate of 3 cu. ft. (85 litres) per min., when tested as prescribed in Standard Tests.

No. 50 Eureka Shields give both face and head protection tilted-up functions as an eye shade—Ideal for men working under conveyors and close head room where bumps and lacerations are a problem.

HEAD & FACE SHIELD #1

Option of three windows—parts are completely interchangeable and may be adapted to almost every industrial need.

PLASTACELE—3 colors (clear, amber and green)——3 thicknesses .020, .040 and .060 and seven sizes from 4 x 9 to 16½ x 7½; for spot, flash and gun welding, buffing, polishing, wire brushing, die casting, flying scale etc.

MONEL SCREEN—(24 mesh in 5 sizes (4 x 9, 6 x 9, 8 x 9, 10 x 9, and 14 x 7¾) for babbitting, protection against heat, heavy scale and numerous other operations.

FIBRE FRONTS with glass holder makes this an ideal acetylene welding shield. Specify shade welding plate desired.

We've had more than twenty years of experience in selling and servicing safety equipment to industry—so let us have your inquiries on safety tongs, vacuum lifters, sheet metal lifting hooks, guards, ejectors, gloves.

THE BOYER-CAMPBELL COMPANY
6547 Antoine St. DETROIT, MICH.

Occupational HAZARDS

NOVEMBER 1939

Volume 2 Number 2

CONTENTS

	Page
Free Literature	2
The Safety Valve	3
Protectors in the Standard Safety Code	4
New Light on Industrial Hazards	6
A B C's of Industrial Dust Control	10
New Products in the Field	14
Carbon Monoxide Hazards	16
Control of Dermatitis Caused by Metallic Compounds	20
Turning the Spotlight on the Small Plant	23
Right off the Docket	26
American Industrial Hygiene Association	28
This Month in Washington	29

Copyright, 1939, by the INDUSTRIAL PUBLISHING CO. Published Monthly.
812 Huron Road, Cleveland, Ohio

Irving B. Hexter, President — L. P. Aurbach, Vice-President
W. S. Papworth, Associate Editor — Ralph Phelps, Representative

New Light on INDUSTRIAL HAZARDS

By HARRIS REINHARDT

Commercial Engineering Department
Westinghouse Lamp Division
Bloomfield, N.J.

THE important part which good lighting plays in the prevention of industrial injuries is so well known that any advancement in the standards and methods of industrial illumination may well be considered as a significant step towards greater safety in industry.

The rapid improvements in industrial lighting standards which have taken place within the last few years are indicated by the publications of the Committee on Lighting Practice of the Illuminating Engineering Society.

Researches on Industrial Lighting

The accompanying table gives a list of those studies which have been published as well as those which are now in progress. These studies have been carried on by sub-committees comprised of a number of illuminating engineers and representatives of the particular industry under investigation. A thorough analysis is made of all the seeing problems involved in the various operations of the industry, in order to determine the most satisfactory type of illumination, and the way in which it may be supplied. The results of these studies are incorporated in the reports published in the Transactions of the Illuminating Society as shown in Table I.

New Foot-Candle Tables

These studies, together with other advancements in the field of industrial lighting, have formed the basis for the new foot-candle tables as published in the Recommended Practice

An average of 35 foot-candles is produced by this installation of units of one mercury lamp and three 150-watt Mazda lamps, spaced on 18 x 18' centers, 13 feet from the floor. 35 foot-candles are generally considered as adequate lighting for work such as this.

of Industrial Lighting. In the older foot-candle tables, it was common to find specific values given for each operation, frequently with the value for one type of operation differing from that for another by only a foot-candle or so. The values in the new tables are confined to rather large steps, such as 5, 10, 15, 20 and 30 foot-candles. The recommendations for a number of operations, where special or supplementary lighting is required, are classified into groups A, B, C or D and a special discussion of the type of lighting required to meet the needs of each of these included in a foot-note.

New RLM Standards

Considering first the developments in industrial lighting equipment, the activities of the RLM Standards Institute are of particular interest in view of the large part that the RLM Standard Dome Reflector has played in industrial lighting since its introduction in 1920. This reflector was designed to fill the need for a reflector for general lighting in industry which would be more satisfactory than the wide variety of types then in use. They are made by a number of manufacturers in accordance with standards set up by the RLM Standards Institute, the letters "RLM" now being used to signify "Reflector and Lighting Equipment Manufacturers."

TABLE I

Illuminating Engineering Society Researches on Industrial Lighting

Reports published in I.E.S. Transactions	Date of Publication
Printing Industry	March, 1936
Shoe Manufacturing	March, 1937
Textiles—Grey Goods and Denim	March, 1937
Candy Manufacturing	May, 1937
Intricate Production Assembly and Inspection Processes	Dec., 1937
Textiles—Silk and Rayon Throwing and Weaving	Jan., 1938
Machining of Small Metal Parts	Jan., 1939
Lighting of Power Presses	Feb., 1939
Other Studies now in Progress	
Glazing and Inspection of Suede and Polished Kid Leathers	
Rubber Industry	

Local lighting units for close work. The 100-watt lamp in each reflector produces an average of 300 foot-candles.

The specifications issued by the Institute establish basic standards of efficiency, design and quality, and provide a method whereby compliance with these standards may be determined by an independent test-

ing organization—the Electrical Testing Laboratories. The RLM label affixed to each reflector is a certificate of compliance with the specifications.

Originally, standards were set up for only one type of reflector, known as RLM Standards Dome Reflector. Within recent years, the standards for this reflector have been raised and specifications for other types of reflectors issued.

The RLM Deep Bowl Reflector and the RLM Symmetrical Angle Reflector were added in September, 1937. Units of this type have been on the market for some time but have not been previously covered by RLM Standards. This indicates an important step towards standardization and simplifies the problem of industrial lighting by making available equipment which may be purchased with the assurance that it meets the highest standards of lighting efficiency.

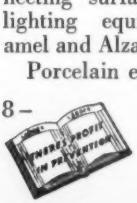
The most recent addition is the RLM Silvered Bowl Diffuser, designed for use with either a 300 or 500 watt standard silvered bowl Mazda lamp. This unit is designed to provide maximum uniformity of general illumination when the spacing between the units is not greater than their mounting height. The silver bowl lamp together with the design of the reflector, eliminates the danger of glare from direct viewing of the lamp and makes the unit particularly well suited for applications where a low mounting is necessary and a high level of illumination is required. It combines for the first time two of the most important reflecting surfaces used in industrial lighting equipment—porcelain enamel and Alzak aluminum.

Porcelain enamel because of durability and ease of cleaning has long been one of the most popular reflecting materials for industrial lighting equipment. Improvements in this material are indicated by the specifications for the RLM Dome Reflector in which the reflection factor for porcelain enamel has been raised from 75 per cent to 77 per cent. Alzak aluminum is a newer type of reflecting surface which is being used to an increasing extent in industrial lighting equipment.

Alzak is the name of a patented finish for sheet aluminum by which a desirable non-tarnishing surface with a high resistance to corrosion is produced. Reflection factors of 85 per cent for specular surfaces and 80 per cent for diffuse surfaces are commercially obtainable. Alzak aluminum is particularly well adaptable to high mounting reflectors where a somewhat concentrated distribution of light is required to prevent loss of light on the upper walls, and also floodlighting equipment where accurate control of the light is essential. It is also useful in local lighting reflectors of the type illustrated in Fig. 2 in which the lamp is mounted in a base down position and located so that most of the light must strike the reflector before escaping from the unit. This gives more accurate control of the light distribution and makes it possible to produce a high level of illumination over a restricted area.

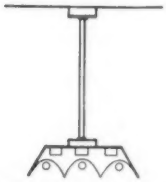
Lamps

Turning to the field of lamps for industrial lighting we find a continued increase in the efficiency of all types of incandescent lamps. The white bowl lamp which was developed specifically for use with the RLM



Dome Reflector has recently been improved through the use of a new type of enamel which makes it possible to burn the lamp in any position rather than restricting it to base up burning as in the past.

In installations equipped with 200 watt RLM Dome Reflectors a substantial increase in illumination is possible through the use of the 300 watt lamp which has a medium screw base and a light center length equal to that of the standard 200 watt lamp.



CROSS-SECTION OF UNIT
3 - 48" LAMPS
48" ABOVE TABLE

6'

4'						
	53	69	78	78	69	53
	70	88	100	100	88	70
	70	88	100	100	88	70
	53	69	78	78	69	53

This chart shows the illumination produced on a table 48" below a trough unit containing three 40-watt 48 inch lamps in individual reflectors.

Because of the resulting high brightness of the lighting unit, this practice is not recommended except in installations where an increase in the level of illumination is necessary and conditions are such that the present 200 watt fixtures cannot be immediately replaced.

One of the most significant improvements in incandescent lamps has been the development of the coiled coil filament which is now used on all 60 watt Mazda lamps for general lighting service. In this lamp the filament which was previously made in a single coil has been re-coiled or made into a double coil, which increases the efficiency approximately 10 per cent and makes possible a reduction in the size of the bulb from the A-21 to A-19. This means that the maximum diameter of the bulb is now only 19 eighths of an inch or 2⅜ inches. This together with a corresponding decrease in the length of the lamp makes it possible to use a 60 watt lamp in local lighting reflectors previously designed for a 40 or 50 watt lamp.

This trend towards smaller sizes in incandescent lamp is particularly evident in the development of the bipost lamp in the 1000, 750 and 500 watt sizes for general lighting service. These lamps are made in tubular bulbs, T-24 for the 1000 and 750 and T-20 for the 500 watt size. The reduced size as compared with the 1000 and 750 watt PS-52 and 500 watt PS-40 lamp with mogul screw base has been made possible through the use of a hard glass for the bulb, a special construction for the base, and the development of a screen grid which is mounted directly above the filament so that a large part of the blackening is deposited here rather than on the inside surface of the bulb where it would cause a significant loss in light output.

(Continued on page 32)

Industria DUST CONTRO

By Roy P. Warren, Research Engine
Buffalo Forge Co.
Buffalo, N.Y.

PART V—The Recovery Angle—Ore Crushing Plant

THIS is the fifth and concluding article in Mr. Warren's informative series on the control of dust in industry.

General

Even though ore crushing is a very dusty operation it is generally carried on in the open air so that the danger from exposure is relatively small. If by chance this operation is enclosed it may or may not be hazardous from the health angle. For the purpose of this discussion, let us consider only that type of a crushing plant which does not cause a health problem.

Collection and Conveying

There are three types of major operations, namely, initial crushing, crushing of primary fines, and crushing of secondary fines. Incidental to these operations we find the moving of ore from one belt to another and the loading into bins for storage. These major operations are made up of machinery which contribute many different sources of dust such as hammer screens, points of charging and discharging, etc. Hammer Screens, Belt Feeders to Discharge Sorting Belts, Storage Bins, Chutes from Crushers, and Belt Feeders from Screens will all have to be controlled.

Now, the collection proper is accomplished by suction. Ore dust is relatively heavy and the face velocity should be up around 500 ft. per minute, while carrying velocities in the duct should be held to about 4000 ft. per minute to 5000 ft. per minute. Long horizontal runs of duct work should be avoided when possible. Due to the corrosive action of the dust there have been many types of elbows or bends developed which range from rubber surfaces to wooden units. It can be noted that these are all designed so as to be easily replaced.

Disposal and Recovery

Cloth filter units and wet scrubbing have been in general use. The application of electrostatic precipitation is possible. In all cases the balance between the value of the reclaimed

material weighed against the cost of recovery is the important phase of the work. This, of course, will depend on the per cent of precious metal in the ore and subsequently in the dust. Power costs will generally run around 3 horsepower per 1000 ft. of air handled. In the case of scrubbing the use of settled water is feasible so that this item is relatively low.

The amount of material reclaimed by these methods is fairly high, it being customary to collect well over 95-99% plus of the entrained dust measured by weight.

While this type of dust control has not had the publicity that the first described has, it is a very active field and will, it is believed, tend to increase as the science of dust control becomes better known.

Process Control—General

We can consider the manufacture of optical cement and its uses to illustrate this application of Dust Control. As a reference, we use a paper published in November, 1937, by the writer in collaboration with K. B. Castle, Jr., an engineer with the Rochester Gas and Electric Corporation.

This paper recites that the problem was created when it was realized that the extreme precaution and high degree of technique used in removing all impurities from optical cement were counteracted by the exposure of this cement for some 40 seconds to the air in the laboratory when the material was poured into stick form. In this case, the presence of any particles over 4 microns in size in the cement caused the object which the cement was used in to be rejected.

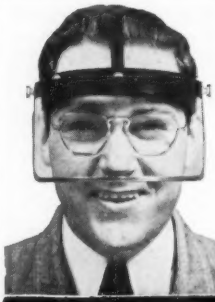
a New Kind of GAUZE
STICKS TO ITSELF!
New, practical. Use instead of gauze or adhesive tape. Already used in thousands of plants. Men like it. Keeps them on the job and makes them want injuries and wounds bandaged. Send for free sample, literature and prices. General Bandages, Inc., 508 S. Dearborn St., Chicago, Ill.
GAUZTEX
GAUZTEX
THE SELF ADHERING GAUZE
MEDICATED WITH MERCURIC CHLORIDE ANTISEPTIC

This in turn contributed to the failure of a production schedule, the penalty for which failure was a substantial amount.

Control

It was agreed that part of the solution lay in the ability of the engineers to reduce the dust content of the general atmosphere of the working area in which the cement was made to within known tolerances. This was accomplished by putting the room under pressure and filtering the air in it to the required degree. By maintaining a positive pressure of ¾" W.G. no ordinary atmospheric air was allowed to enter. The next part of the problem was one of so altering and repairing the room construction that no dust would be released by moving persons. This was accomplished by the use of new smooth flooring and glazed surface paints with all smooth walls. After this treatment the clothing in which the persons worked was especially selected.

The use of rubber floors can be recommended and also cellophane or similar clothes. It helps if the hair of



TYPE CH-3
Pending Patent

Send for folder describing this and fourteen other models

JACKSON Eyeshields

Ideal for many industrial uses including light grinding, metal finishing, resistance welding, etc., this light weight, well ventilated shield is non-fogging—provides excellent vision without distortion. Cellulose Acetate visor has full metal binding and can be adjusted at any angle. Sparks will not affect it nor will hot metal particles adhere to it. Depth of visor four inches. Other depths at small additional cost.

Available in clear, smoked, amber and light green, the **PRICE** is **$1.35** F.O.B. Detroit. For fireproof skull cap, add 35¢. **Ask your dealer or order from this advertisement.**

JACKSON ELECTRODE HOLDER CO.
15122 Mack Ave. Dept O-1 Detroit, Mich.

the workmen is protected by silk or similar caps. Thus, the remaining chance of pollution comes from the skin of the workmen or from the equipment involved. It was possible to reduce the dust count of the room air to around 250,000 particles per cubic foot of air, practically all of which were well under 4 microns. Dry filtration was then used, but since the publication of this paper electrostatic precipitation on a commercial scale has been introduced which has shown far better results.

Conclusion

The example quoted is one which it is admitted will not commonly exist. However, there are literally thousands of such cases to be found in industry, many of which do not come to light except when some process by virtue of its failure causes or contributes to some major breakdown.

Determinations or Tests

It is becoming usual practice for the purchaser to demand performance data. These demands may or may not be in the form of guarantees. The manufacturers of this sort of equipment must by all means be a party in determining what method is used to test the performance of his equipment so that the same basis is used for the test and his rating. There are approximately 58 different devices made for the purpose of making dust counts of which four are in most common use. There are also four common methods of determining the efficiency of dust collecting jobs.

It is interesting to note that only one method of dust removal (electrostatic precipitation) publishes a guarantee of removal by the blackness test. This test is the most critical of all known at the present time. One fallacy of the removal by weight method is that even with a 90% removal of dust particles by weight the remaining contamination of the effluent may be sufficient to make negligible the net result of the installation.

Summary

In conclusion the writer wishes to point out that invariably an indus-

Mining and quarrying present a considerable problem in dust control. This typical operation, drilling, exposes workers to unhealthful concentrations of dust if proper control measures are not used.

trial dust control problem has to be carefully engineered and that each problem usually contains some special conditions which are pertinent to that particular problem alone.

This is also true of the dusts found in industry. It is impossible to generalize on the character of the dusts found in similar industries unless the operating conditions are absolutely alike and it would be rare indeed to find this situation.

It is, therefore, suggested that the following sequence would be proper to follow in attacking an industrial dust problem.

1. Determine the scope of the control.
2. Determine method of collection.
3. Determine conveying velocity.
4. Determine method of disposal and subsequently the type of equipment to be used.
5. Determine the method of testing and maintaining level of operation.

It has truly been said that almost every dust control problem must be considered as a whole and not in terms of any separate part.

Safety Shoe Saves Foot

The Youngstown Sheet and Tube Co. reports that a catcher helper on a temper mill at its Indiana Harbor works had a tractor and coil weighing 14 tons pass over his foot. The helper was centering the coil in the lifting band when the accident occurred. He was holding the band and did not expect the tractor to move so far forward. The front wheel of the tractor ran over his right foot causing painful injury. But the worker still has his foot and all his toes, since he was wearing safety shoes.

MILBURN SCORES AGAIN!

Announcing PLY #8

Welder's Cream . . . for prevention of arc Burns

A vanishing type cream that rubs into the skin. Has the ability to block the Ultra Violet and Infra-red Rays from welders' operations, especially in heavy welding.

Recommended for areas of exposed skin surfaces subject to welding burns where serious secondary degree burns may be experienced.

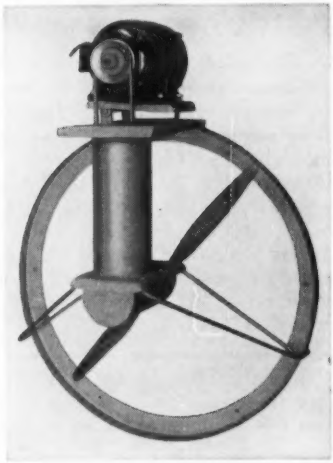
Water soluble for washing-up purposes. Available in six-ounce jars, packed twelve to a carton.

DISTRIBUTORS IN ALL PRINCIPAL INDUSTRIAL AREAS

MILBURN CO., Detroit, Mich.

New Products

PROPELLER FAN with motor entirely out of air stream is now being manufactured by the Hartzell Propeller Fan Company. The new fan is designed for spray



booth work and other applications where inflammable fumes, extreme heat, or abrasive or corrosive substances should not come in contact with the motor.

OPTICAL PYROMETER of the potentiometer type, which measures high temperature optically with laboratory precision, is announced by Leeds and Northrup Company. The Pyrometer is intended for use in furnaces, ovens, and other high temperature operations, and has the advantage of high accuracy, together with protecting the worker from excessive heat or exposure to noxious gases.

WIRE ROPE SLING, with a large factor of safety to workmen's hands, and with exceptional ease in removing from loads, is announced by Macwhyte Company. Called the "Y-Guard" sling because of its patented tapered steel ferrule, it eliminates the protruding ends or wire seizing of the conventional eye splice.

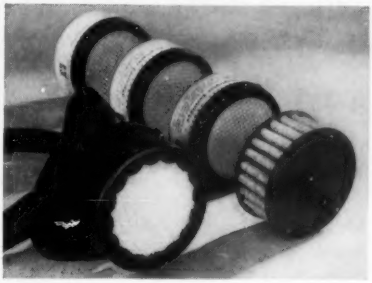
AIR CONDITIONING department of the Westinghouse Electric and Manufacturing Company announces a new, ultra-compact air-conditioning compressor. The compressor is built in a unit, lighter in weight,

with completely enclosed motor, mounted on a common crankshaft with the compressing mechanism. The new 16-cylinder, V-type, 100-ton unit is smaller than previous units, and is intended for use in industrial air-conditioning, particularly textile, tobacco and large printing plants. Feature of this compressor is the small floor space required, light weight, not requiring special foundations, and low maintenance costs.

Additional information and descriptive literature on any of the products mentioned in this service department may be obtained by writing **Dept. N,** OCCUPATIONAL HAZARDS & SAFETY, *812 Huron Road, Cleveland, Ohio.*

IN THE FIELD

NEW PROTECTIVE FILTERS for American Optical respirators have just been developed, which make available a total of four different types of filters for this respirator. One of the new filter cartridges is designed for use against low concentrations of fumes and gases encountered in paint spraying and other light organic vapors. A second filter cartridge is designed for use against low concentrations of acid gases, and the third filter cartridge against low concentrations of acid organic gases.



Statements made in connection with any product mentioned in this service department are based on manufacturers claims. Although these claims are believed to be true, this magazine does not guarantee that to be the case.

NEW FACEPIECES will be standard equipment on all Mine Safety Appliance gas masks. The features of the new facepiece are wider vision, greater comfort, and increased efficiency. Extensive research was conducted to: (1) provide maximum usable lens area, (2) restrict dead air space to the minimum, (3) prevent fogging of lenses, and (4) keep weight as low as possible.

The new facepieces, which are approved by the U.S. Bureau of Mines, eliminate "pressure points," which have often been the cause of headache and fatigue.

ANTISEPTIC PROTECTIVE CREAM which forms a tough, protective film over skin surfaces, and which is valuable in curbing various industrial dermatitis—particularly in the cement, oil, paint, foundry, fertilizer and chemical industries—is now available for national distribution. The cream, known as Stover's Protective Cream has had wide acceptance by industry on the West coast, where it has been used in many of the large industrial and construction projects.

CARBON MONOXID

THE HAZARD of carbon monoxide poisoning is as old as fire itself—for carbon monoxide is the result of incomplete combustion of carbon compounds. Today carbon monoxide is undoubtedly one of the most troublesome poisons in industry, for there are few industrial activities that do not, at some point, offer a real or potential diffusion of carbon monoxide.

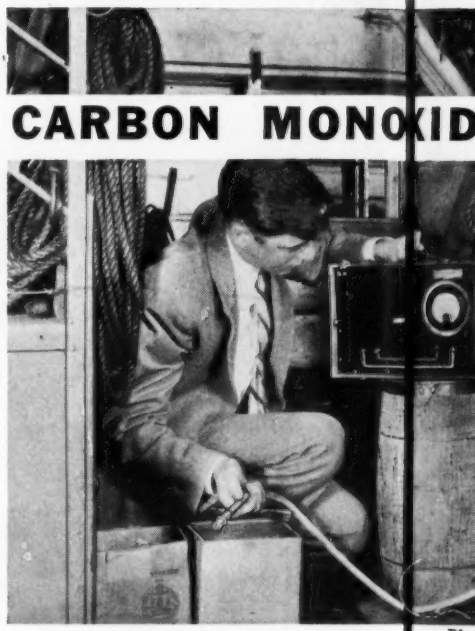
The first International Congress of Labor in Washington in 1919 directed delegates to call to the attention of their respective governments the steady increase in industrial carbon monoxide poisoning. Despite the wide publicity that has been given the hazardous nature of this gas, it appears that, today, the hazard of carbon monoxide poisoning in industry is on the increase.

Industrial Sources

The production of carbon monoxide takes place in incomplete combustion—often denoting inefficiency in the process. This may be in forges, furnaces, internal combustion engines, gas burners and a myriad of other places. Recent extended applications of gas burning in industry have increased the necessity for understanding and control of this hazard, particularly where *groups* of appliances are used.

Since there is danger to life, if as much as 0.2 to 0.3 per cent of carbon monoxide is breathed for from one to three minutes, it is plain that exposure to the above concentrations would result in intense asphyxia.

Carbon monoxide poisoning is either acute or chronic. Acute poisoning often results in death, but immediate treatment—removal to fresh



Pho

Determination of the amount of carbon mono in the a indicators made for this purpose. Such indi s should potentially serious hazardous co ntration

air, oxygen therapy, etc., often makes possible complete recovery. Chronic carbon monoxide poisoning is usually the cumulative manifestation of

the pos nox cum

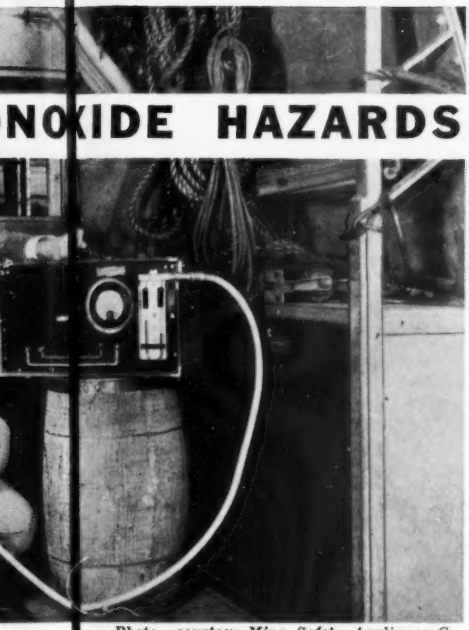
Following is a list of the percentage of carbon monoxide found in some of the more common gases:*

Illuminating gas:	
from hard coal	4-10%
from soft coal	3-8%
American	20-30%
Water gas	25-41%

* Flury and Zurnik.

Generat from from from

Gas fro Gas fro Gas in Automo Air in



Photo—courtesy Mine Safety Appliance Co.

oon mono in the air is rapid and accurate with special Such indi s should be available wherever there is a zardous co ntration of carbon monoxide.

kes
onic
ual-
of

the damage caused by many exposures to the poison. Carbon monoxide poisoning itself is not cumulative—recovery from the poisoning is complete, but the *damage* done by the presence of the poison remains. This damage usually takes the form of nervous and mental disturbances, injury to the central nervous system, pains in back, lower abdomen and chest, twitching and cramps, intestinal disturbances, shortness of breath, and sometimes secondary anemia.

Discomfort begins with the inhalation of about 0.02% of carbon monoxide in the atmosphere. Prolonged exposure to this amount (and greater amounts) encourages the development of the chronic poisoning. Chief complaints of workers so exposed are:

1. Headache, usually in the front part of the head, often severe, typical
2. Vertigo
3. Nervousness
4. Neuro-muscular pains

Note that these symptoms are of the sort that could rise from a variety of sources. Because carbon monoxide is colorless, odorless, and otherwise difficult to identify and, because the symptoms often seem non-specific, it is incumbent upon management and workers to take special precautions to seek out the dangerous gas, and to apply preventive measures.

Identification

In any combustion operation, where the presence of carbon monoxide is suspected, regular periodic checks should be made to determine the amount of carbon monoxide in the atmosphere. The best way to determine this is to use one of the analyzers made for this purpose by several manufacturers of such equipment. These analyzers are easy to use, dependable, and not expensive. Concentrations of over 0.02% are likely

Generator gas:	
from coal	22-26%
from wood	up to 34%
from coke	33%
Gas from explosion of black powder	3-9%
Gas from explosion of dynamite	34%
Gas in mine after blasting	0.01-.05%
Automobile exhaust gas	3.5 to 12%
Air in commercial garages	0.05-2%

entage
some

.4-10%
...3-8%
.20-30%
.25-41%

CARBON MONOXIDE, in hazardous concentrations, may be found in the following industrial operations:

1. Blasting.
2. Internal combustion engines.
3. Linotype and other casting machines using gas.
4. Furnaces and stoves.
5. Manufacture and distribution of gas.
6. Dry kilns.
7. Gas heated irons in laundry, hat, and garment manufacturing.
8. Gas heated presses in plastic industry.
9. Salamanders.
10. Smelting and refining.
11. Garages.
12. Steel and iron production.

to cause discomfort to the worker, and analysis which reveals this concentration should lead to remedial measures.

From an engineering point-of-view, management can do the following things to lessen the carbon monoxide hazard:

(1) Adjust flames, drafts, processes and equipment so that the formation of carbon monoxide is eliminated or minimized. This is not only necessary from a safety point-of-view, but because such proper adjustment indicates more efficient operation of the process, thus saving money in production.

(2) Remove carbon monoxide, when it is unavoidable, at the point of origin, by adequate exhaust ventilation.

(3) Have a regular testing routine to determine the presence of carbon monoxide.

(4) Provide gas masks where exposure is unavoidable.

(5) Where concentrations of more than 0.02% are likely, provide oxygen tanks or inhalators.

(6) Pay special attention to internal combustion motors, exhausts, condition of machinery, to see that carbon monoxide is not escaping into the air.

(7) For gas heated appliances:

(Continued on page 32)

Photo—courtesy Mine Safety Appliances Co.

Victims of acute carbon monoxide poisoning must be treated immediately to prevent fatality. The illustration shows the use of an inhalator for administrating a mixture of oxygen and carbon dioxide — the recommended treatment.

WHAT'S YOUR SAFETY PROBLEM?

BREATHING HAZARDS?

You will find the correct answer in the more than 40 types of

PULMOSAN RESPIRATORS

for Dusts, Fumes, Gas, Smoke, Sprays

The most complete line on the market. Every model carefully engineered to give high safety, comfort, ease of breathing and economical service. Tell us your needs.

CHEMICAL HANDLING?

Here are many valuable safeguards:

- Carboy Truck
- Carboy Tilter
- Carboy Drainers
- Acid Siphons
- Acidproof Gloves, Goggles, Aprons
- Fume Respirators
- Acidproof Pails and Dippers
- Acid Hoods
- "Ply" Skin Protectives

Workers' Safety?

- Safety Goggles (All types)
- Safety Clothing (Aprons, Gloves, Leggings, Spats, Shoes, Toe Guards, Suits, etc.)
- Safety Hats
- Safety Belts
- Gas Masks
- Machine Guards
- Safety Ladders
- Ladder Shoes
- etc., etc.

Plant Safety?

- Waste Cans
- Safety Cans
- First Aid
- Safety Tools
- Bulletin Boards
- Safety Signs
- Etc., etc.
- Etc., etc.

• **WRITE** *for information and prices on any problem or product for safety. Ask for complete catalog.*

INDUSTRIAL SAFETY EQUIPMENT ASSOCIATION

PULMOSAN SAFETY EQUIP. CORPORATION

Dept. OH, 176 Johnson St., Brooklyn, N. Y.

Control of dermatitis requires protection from the irritating substances.

Illustration, courtesy Pioneer Rubber Co.

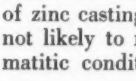
PROMINENT in the list of the primary causes of dermatitis are certain compounds of some metals—arsenic, chromium, nickel, zinc, mercury, and others.

Industrial hygienic research has provided specific preventive measures to be used in preventing dermatitis caused by each of these compounds. It is a discussion of these specific preventive measures that we undertake here.

It must be understood that we are speaking of the *compounds* of these metals. The metals in themselves are not necessarily hazardous. For instance, certain compounds of zinc can cause acute dermatitis, but handling of zinc castings or other pure zinc is not likely to result in a specific dermatitic condition.

It must be further understood that certain substances will cause dermatitis at certain times. Practically any chemical may be irritating to some people at some time. We select here only those compounds of some metals that have proved themselves hazardous to skin health in the vast majority of cases.

As a preface to specific prevention, we must point out that certain people



are, by the nature of their physical make-up, unduly susceptible to dermatitis caused by these metallic compounds. The best professional thought on this matter is that such people should immediately be transferred to other work, or to handling substances to which they are not specifically allergic.

Dermatitis, generally speaking, may be caused by one or more of the three following conditions: (1) direct contact of the workers' skin with the material in question—handling, packing, dipping, etc. (2) Contact of the workers' skin and fumes rising from the noxious substance. (3) Contact of the workers' skin with particles of the noxious substance in the form of dust.

The best preventive device of all is to make handling of hazardous substances unnecessary. This is, of course, impossible. But it is possible to arrange processes and manufacturing devices in such a way that a minimum of contact with workers' skin is required, and that the hazardous substance shall be, at all times, as nearly as possible under control. Much splashing, dripping, and spilling of hazardous liquids can be eliminated.

When the process itself is at maximum control, then the necessary protective devices should be considered.

Each one of these three types of contact indicates certain preventive measures. Group 1 (handling) resolves itself into a matter of shielding the skin of the worker from the irritating substance.

In the ordinary case where handling of irritants is required, protective clothing is indicated. A wide variety of clothing, boots, aprons, gloves, face shields, etc., is manufactured, some for general protection, and some for specific isolated situations. The proper use of such protective clothing is fundamental—after control of the process, it is the first thing to consider.

Certain precautions must be observed in the use of protective clothing, lest that protection do more harm than good. The boots must fit properly, be snug around the top to prevent irritants dropping or splashing inside; gloves must be of sufficient length, closed at the wrist, for the same reason. Sleeves should be long enough to protect the entire arm, and provision should be made for close union of glove and sleeve.

The reason that this clothing must be highly efficient in this respect is that if any of the protective clothing permits the entrance of an irritant, it forms a compress, forcing the irritant into prolonged contact with the skin. This is much worse than no protection at all. Gloves, particularly, must be of such fit and quality of material that punctures (and consequent admittance of the irritant) shall be eliminated to an almost ideal degree. A further contributing hazard in this respect is the fact that the wearing of protective clothing induces a tendency to sweating. The moist, warm skin of a sweating worker is more susceptible to irritation than his normal skin. It will be seen that the wearing of some protective clothing, therefore, increases susceptibility to the irritant it is designed to overcome. This imposes a burden on management and worker to see that protective clothing be of sufficient quality of materials, of proper design, and be worn properly.

There are cases, of course, where the wearing of gloves is not practical, or where gloves do not give the protection required. Researchers in this field have found that proper washing, application of an ointment before and after work, and often application of certain protective powders are the desirable courses.

Fumes

Protection against fumes causing dermatitis, the second type of contacts with irritants, is ideally achieved by removing the irritating fumes at their source, and preventing any escape into the air. Such removal of fumes at the source is the first requirement of prevention.

Many situations obtain where it is not possible to entirely remove such fumes. Recourse must be had to personal protective devices—clothing, face shields, caps, goggles, etc. Of course the subject of fumes as a hazard to the respiratory system is a subject in itself, but we are concerned here only with fumes as a cause of dermatitis.

In addition to removal of fumes at the source, adequate general ventilation is important. Frequent changes in the work-room atmosphere prevent accumulation of noxious fumes which have escaped, and replace irritating atmosphere with fresh air.

Dusts

A vital consideration in dermatitis caused by dusts, the third type of contact, is the condition of the skin of the workmen. Dry dusts are likely to be less irritating to the skin than dusts introduced in the presence of moisture. Dusts in contact with the normal skin are less injurious than dusts in contact with a warm, moist skin.

Both dusts and fumes, as well as contact with the solid or liquid irritant, are infinitely more dangerous when the normal protective covering of the skin is interrupted. Chafing, abrasions, cuts, and removal of normal skin oils are in invitation to contraction of dermatitis. This fact is obvious in the case of solids or liquids —less so in the case of fumes and dusts.

Prevention of dermatitis caused by dusts indicates measures to eliminate excessive perspiration, freedom from chafing by improper clothing, and immediate treatment of all breaks in the skin surface. Additional preventive measures for dusts are the same as mentioned above for fumes.

DERMATITIS—a diseased (pathological) condition of the skin is always caused by contact with an external irritant. Many irritants are sufficient in themselves to bring about dermatitis, other irritating substances are sometimes so, and sometimes only in conjunction with other circumstances. For instance, cement dermatitis is increased in frequency and severity in cases where clothing chafes the skin, and also in the presence of perspiration. There is no absolute measure of the hazardous nature of these so-called irritants—they may or may not cause dermatitis, depending upon the surrounding circumstances.

However, certain substances are recognized as being hazardous by themselves without any contributing subsidiary causes. These substances will remain the primary source of the dermatitic condition, and must be subject to preventive measures in all cases.

Individual Responsibility

Adequate hygiene is necessary in prevention of dermatitis. Workmen must wash themselves with a non-irritating soap and warm water, and dry thoroughly, before eating—always at noon and when finishing work. Shower bath with warm water and non-irritating soap should be

(Continued on page 31)

Turning The Spotlight on the SMALL PLANT

By EDWARD C. JACOBS
Assistant District Engineering Manager, American Mutual Liability Insurance Company

Process Factor

Another factor in accident control within management scope of responsibility is that of manufacturing process. This cannot be discussed in detail because processes cover every conceivable method of manufacture and every conceivable scheme of planning the service to be performed. No limitation was found within which manufacturing methods of small plants may be considered to fall always. There is, however, this view of the process question which seems to be borne out. Small plants seldom, if ever, get into mechanized mass production. That development is usually a large plant condition because mass production is associated with widening markets and lower manufacturing costs. The increase in output which must follow mechanization would take the plant out of the small plant class. On the contrary, many small enterprises are almost entirely hand work. It is, therefore, necessary to recognize the contributions which process makes to the causing of accidents in the individual small concern. It cannot be done categorically. The greatest contribution to accidents that process makes in small plants is in the single field of material handling. Highly mechanized processes are usually accomplished with mechanical conveyance of materials. In small plants conveyances are very often accomplished by brute strength and awkwardness. Wrong methods and tasks for which employees are unsuited physically add to the total of injuries in many instances.

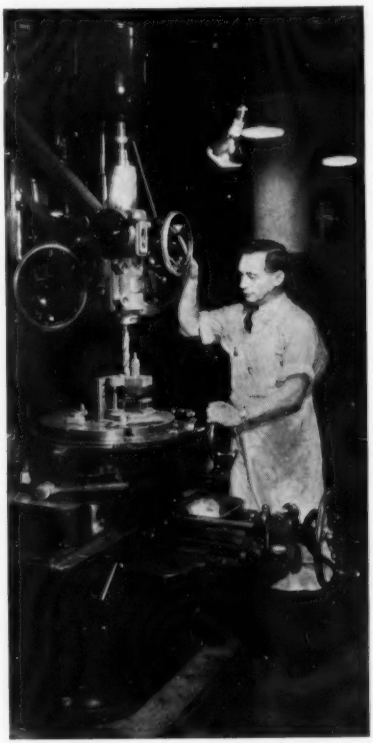
Let us go back to the small plant—the one man concern, described so because throughout the breadth and depth of operation management was the whole business. We will look at the question of supervision and maintenance which are problems deep in the enterprise. They are deep in the accident control question. They represent that vertical direction of activity which is involved in intimate details in every single motion which goes on in the plant. Disregarding all questions of marketing, financing, pur-

chasing, production, there are not sufficient hours in the day, or sufficient strength in the man to give the attention to plant operations which accident control demands of the supervisor and leave time to buy, sell and finance and direct in each of these divisions of effort the same degree of attention to the details which they deserve. Whatever the circumstances may be, supervision is a division of management which stands in the direct charge of the employees and their equipment and which must operate to maintain the equipment and supervise the safe practices if accidents are to be controlled. Without it accidents will not be controlled.

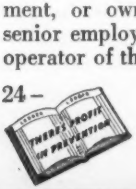
Supervision Factor

The differentiation between large and small plants is very sharp in the quality and quantity of supervision. In the one case we will find a definite group of supervisors—men who actually operate the plant. In all cases where a good job of accident control has been done, these men have been leaders of men and teachers of men.

In the small plant, however, direct supervision by a foreman is the exception rather than the rule. There may be a workman superior to the others who lays out the work, gives orders, and, in many cases, approaches the duties and responsibilities of the foremen. There may be a distinction and a difference, however, in that his responsibility does not include maintenance of the equipment, nor the employment and training of the other workers. His responsibilities are limited. Sometimes he receives his orders from the management, or owner, because he is the senior employee or because he is the operator of the machine, which is the key to the whole production program. Sometimes, because he is superior in intellect. More often than not, he does not exist. The men are hired because they represent themselves as qualified for a certain kind of work. They are given a job. They are told to do it, and they may work for weeks on end without any safe practice supervision whatsoever. The owner, or the manager, is himself in the plant enough



The small plant has much the same hazards as the large one—the same machines, the same use of hazardous substances. Control is just as necessary in the small plant as in the large one.



of the time to provide the direct general supervision which is needed, or at least to provide all which is given. The enterprise may suffer for want of an individual with sufficient authority or responsibility to maintain the equipment in safe condition to conduct the various plant operations in a safe manner, and to select, train and supervise employees in safe practices. I think we have in this category the principal accident difficulty of small plants.

Let us first put our house in order at the top. In my opinion the employees' contribution in the accident picture of small plants does not give me the impression as presenting a very great problem, at least not so great that the difficulties may not be overcome when the owner accepts and puts into effect the principles we are now discussing.

We can summarize the matter of controlling accidents in small plants as concerning equipment, safeguards, supervision, and the lack of vision to admit that it has happened here. What then seems to be the outstanding difficulty to arriving at an answer? One of the principal reasons for not getting a condition of full safe-guarding and definite supervision is the insufficiency of working capital. I know that many small plants have existed for years with such a close balance between income and expenditures that there is no provision for machinery replacement, and a program of machinery safeguarding has been postponed in anticipation of better days. All small plants, however, cannot truthfully advance the reason for faulty accident control to the financial problem. You can say that you do not have the funds to set up a budget of $5,000 or $10,000 and I will believe you. What of it? What are you going to do now about that part of the accident control program that does not require the expenditure of money? Let us not remain isolated, either in spirit or practice, from the movement for greater safety because of thin budget. There is no reason for this.

THAT 30% . . .

IT IS a fairly well known fact that about 75% of industrial medical service is bestowed upon 30% of the workers. This 30% also require more attention in every other way, for within this percentage are found our radicals, neurotics, indigent, and possibly our worst workers. Years ago we accepted this situation as a necessary by-product of our production. A large proportion of our accidents are not mechanical, but personal. We believe that 80% of them are attributable not to mechanical failure, but to personal carelessness, or human failure, ranging from failure to report slight accidents to the medical department, to complete lack of cooperation, if not recklessness, which some of our employees exhibit. At the moment, however, many of our medical departments are coping with this problem successfully. . . ."

H. W. Lawrence, M.D., writing in Industrial Medicine

Right off the Docket

The trend of litigation on workmen's health and accident compensation is reflected in these briefs of the latest and most representative cases coming to trial in the intervals between issues. Familiarity with this trend is important to every industrialist.

Compensation Awarded for Death Brought on by Unusual Strain Which Aggravated Pre-Existing Heart Condition

The husband of the claimant was a foreman of a crew of iron workers engaged in work in the Library of Congress in Washington, D.C. At the time he was injured he was assisting the workers in lifting steel plates from one floor to another; each plate weighed between 175 and 200 pounds. In the course of the work, one of the workers released his hold on a plate, as a result of which a great strain was placed upon the foreman who was helping to lift the plate. He immediately complained of pain in his left side, became unconscious, was taken to a hospital where he was pronounced dead. An autopsy revealed the cause of his death to be, "acute cardiac dilation." The company resisted the claim for compensation, alleging that the foreman did not die as the result of an injury arising out of and in the course of his employment, and that he had been suffering from a very bad heart condition for 15 years prior to his death.

The Court decided in claimant's favor. It said that while there may have been a pre-existing heart condition, such condition was aggravated in the course of employment and death resulted. The unusual effort made necessary when the co-worker released his hold on the steel plate, and the resulting unusual exertion, were all incident to the work being done by the foreman. *Steinmetz vs. Snead & Co.* (New Jersey) 8 Atl. 2nd 126 (August-1939)

Heat Exhaustion Suffered While Tending Paper Pulp Machine

The employee's job was to tend a "beater," a machine used to chop and beat paper into a pulp. The beating and cutting of the paper from which the pulp was made took place in a solution of water and other ingredients, which was heated to 120°F. by means of the injection into it of live steam. Occasionally the machine would get stuck by an accumulation of pulp around the roller. It then became the job of the man tending the machine to climb to the opening and clear away the pulp from the roller with a pole. This cleansing process ordinarily took 6 to 10 minutes, and at such time the worker was subject to a much higher atmospheric temperature than the average temperature of the room, because of the emission of hot vapor from the machine. On the day when the injury in this case was sustained, the pulp became so heavily plugged around the roller that it took 20 minutes to dislodge it. Immediately after cleaning the roller the claimant suffered an attack of heat exhaustion, and his subsequent disability ensued.

The necessity of working for a period of 20 minutes to clear the machine was found by the Court to be an unusual and unexpected happening. The Court held that heat exhaustion having a causal relation to an unusual and unexpected happening in the course of employment, requiring unusual physical exertion, is an "injury" within the Workmen's Compensation Act, and compensable. *Booth vs. Industrial Commission* (Ohio) 22 N.E. 2nd 502 (May-1939)

North Dakota Finds Pneumonia to be "Injury" Within Meaning of the Compensation Act

The Supreme Court of North Dakota, in this case, held pneumonia contracted by an employee of a county, from exposure while repairing buildings, constructing fences, and planting trees on the county fair grounds, to be an "injury" within the meaning of the compensation act. The employee, during his work, was subject to harsh exposure by reason of excessive rain, cold, and the necessity for kneeling on the ground in the performance of his work.

The Court went on to say, "The Compensation Act does not provide for general health insurance or for general accident insurance, and covers neither accident sustained, nor diseases contracted, by an employee outside of his employment, but does make an injury arising in the course of employment, and any disease proximately caused by the employment, compensable injuries." *Tweten vs. North Dakota Workmen's Compensation Bureau* (North Dakota) 287 N.W. 304 (May-1939)

Employee Who Takes Foot Tablet as a Sedative Entitled to Compensation

The employee injured his foot in the course of his employment. The doctor prescribed bathing the foot in a solution made by dissolving a bichloride of mercury tablet in hot water. The doctor also gave the employee sedative tablets to be taken to alleviate any pain brought on by the injury. One night the employee experienced pain and, in the mistaken belief he was taking a sedative, he took a bichloride of mercury tablet. His death followed.

The Court said, that a direct relation may be found between the first accident to the foot, and the second accident—taking the wrong tablet. A sedative had been prescribed by the physician; also, a bichloride of mercury bath. Both the remedies were for treatment of the injured foot. The injury to the foot flowed from the employee's employment and, consequently, the attempt to minister to the foot also flowed from the employment, and the resulting death should be compensable. *Brown vs. New York State Training School for Girls, et al* (New York) 11 N.Y.S. 2nd 849 (May-1939)

Falling Log Results in Head Injury—Subsequent Work on Federal Project Does Not Prevent Award For Total Permanent Disability

The claimant's work required him to roll poles up on skids, where they were stacked. One slipped and fell, striking the claimant on the head. He sustained a fracture of the skull, concussion of the brain, and a resulting paralysis of the right side of the face, right eye, nose, and a loss of hearing on his right side.

The company resisted a claim for total, permanent disability by offering evidence to show that, subsequent to the accident, the claimant worked for some time on WPA and PWA projects. The claimant offered evidence proving that he became dizzy and tired after working for a short time, that he couldn't do the work properly, that he was nervous and unable to sleep nights.

The Court decided that the question of disability was one for the jury; that the fact that the claimant, under stress of circumstances, and in an effort to make a living for his wife, children and himself, took work on a Federal project would not as a matter of law preclude a claim for total, permanent disability. The jury had decided the question in the claimant's favor, awarding compensation for total, permanent disability, and the Court permitted such verdict to stand. *Traders and General Insurance Co. vs. Daniel* (Texas) 131 S.W. 2nd 276 (July-1939)

Safety . . .

"I think we are all in general agreement as to the objectives of a sound safety program. Our aim should be the insurance of the physical well-being and the economic benefits to the worker of safety and good health. The problem of health in industry is initially one of medicine and engineering. It is a problem of discovering the hazard and pointing out its origin and distribution. From that point on the responsibility is largely one of the engineer in dealing with the source of danger and the installation and maintenance of proper protective mechanisms. In most instances the combination of medical and engineering efforts usually finds a practical solution for the protection of the workers from any particular hazard." *Dr. Willare Machle, Kettering Laboratory of Applied Physiology, University of Cincinnati*

American Industrial Hygiene Association

AN ASSOCIATION to extend the advancement and application of Industrial Hygiene, started in Cleveland last June, will be known as the American Industrial Hygiene Association. The object of the Association is the advancment and application of industrial hygiene and sanitation through the interchange and dissemination of technical knowledge on these subjects; the furthering of study and control of industrial health hazards through determiation and elimination of excessive exposures; and the correlation of such activities as conducted by divers individuals and agencies throughout industry, educational and governmental groups; and the uniting of persons with these interests.

Provision has been made to enroll in various classes of members any person interested in the field of industrial hygiene. Among those groups which we hope to include are persons whose nominal titles may be listed as engineer, physician, safety inspector or engineer, chemist, nurse, personnel, or executive, whenever such persons have industrial hygiene problems which lead to an active interest in the subject. It is believed that only through such a broad organization can information be brought to the smaller units of industry where the full time of an industrial hygienist is not warranted.

Among other activities which we expect to enter into immediately is the incorporation of existing local groups such as the New England Conference and the Michigan Society of Industrial Hygienists. Provision has been made in the interim constitution adopted at the Cleveland meeting for such groups and, as soon as the President has made his committee appointments, we hope to have some action toward the forming of other regional or local groups. The American Industrial Hygiene Association will meet with the American Association of Industrial Physicians and Surgeons in the next annual meeting to be held in the spring of 1940 as it has been written in the constitution that we shall, whenever possible, meet with other organizations; although no specific organization is mentioned in the constitution.

At the Cleveland meeting, the following persons were elected to the Board of Directors: J. J. Bloomfield, D. E. Cummings, Philip Drinker, Wm. G. Fredrick, S. W. Gurney, F. R. Holden, F. A. Patty, C. L. Pool, H. H. Schrenk.

Officers: Wm. P. Yant, President; Warren A. Cook, President-Elect; and Gordon C. Harrold, Secretary-Treasurer.

TEAR OUT

APPLICATION AND DUES SLIP

AMERICAN INDUSTRIAL HYGIENE ASSOCIATION

Name ..... Occupation .....

Preferred address .....

Employer .....

Training (Experience and Educational) .....

.....

Send this coupon and $3.00 covering annual dues from January 1, 1940 to January 1, 1941 to Secretary-Treasurer, Gordon C. Harrold, Ph.D., Chrysler Corporation, Industrial Hygiene Laboratories, 7900 Jos. Campau Avenue, Detroit, Michigan.

This month in *Washington*

Built-In-Safety

By W. T. Cameron, Chief Safety Adviser
Division of Labor Standards, U. S. Department of Labor

AS I get around the country I find an increasing amount of interest on the part of both manufacturers and users of machines in BUILT-IN safety. As readers of this column are well aware, the safeguarding of the production machines of industry—circular saws, grinding wheels, lathes, etc. —has, until only recently, been "afterthought" guarding. You can all remember the time when the machine had been ordered, manufactured, delivered, installed and perhaps already running before the plant safety man was called in to forecast the probable number of fingers, hands or arms which would be fed to the machine unless the safeguards which he hurriedly prescribed were installed.

Perhaps because the early safety man did not enjoy the confidence of management accorded the present-day safety engineer, these early "birdcages" were often rapidly thrown together at a minimum of expense just to satisfy the factory or insurance inspector. This "after-guarding" rarely looked right, usually rattled off, or was deliberately taken off the machine only to be hurriedly put back in place when word was sent out into the shop that an inspector was on his way through.

Fortunately, this situation no longer exists in our more progressive industries. The safety director today participates in all steps of the transaction leading up to the purchase and installation of a new piece of equipment and, as a result, the purchase order not only specifies compliance with the requirements of the State code, but the plans and blueprints specify integral guards built-in and made a part of the machine, proper clearances, the elimination of projections and all of the other things which make for safety and efficiency of operation.

Although this practice of specifying built-in safety is making rapid progress, it is still in the category of indi-

vidual rather than collective pressure upon the manufacturers of machines to adequately guard their machines at the time of their manufacture. The time has not yet come when the manufacturer of a woodworking machine can say, "Apparently the majority of our customers want completely guarded machines—We can't go on building two models, one guarded and the other unguarded, so let's sell nothing but the type our best customers want."

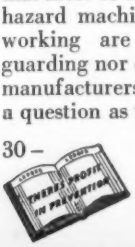
I think every safety engineer will agree that the manufacturers of machines are in a better position than anyone else to design and guard them for the maximum in safety and efficiency. Design is of such vital importance to safety that certain machines, as for instance the ordinary circular (table) saw, cannot be properly guarded unless the machine and the guarding are designed for each other. As to the added cost, I could cite many examples proving that a satisfactory guarding job built into a standard model does not cost over half as much as similarly effective guards (if equal effectiveness is possible at all) added later.

Code Complications

Why, then, aren't more machine builders including safety as standard equipment? Although much has been and is being done by manufacturers of machinery to increase their safety and operation and many excellent examples of designed-in and built-in safety could be cited, the fact remains that most of the commonly used high-hazard machines in wood and metal working are neither designed for guarding nor offered guarded by their manufacturers. The typical answer to a question as to why this is so is, "It's a matter of customer demand, for one thing but, more important, we cannot include guards as parts of standard models, for what one State will accept another may not. In fact, the requirements of most States are so general or incomplete that we don't know what is wanted. Give us definite specifications and we will meet them."

Some preliminary studies we have made indicate that, while some serious conflicts in State codes and regulations do exist, they are not very numerous. Those that do present quite an obstacle. For instance, the Pennsylvania code on circular saws *requires* the hood over the saw to be mounted on the spreader, while several other leading States do not and, in fact, prefer it separately mounted. But vagueness is still the principal characteristic of many State code and statutory requirements. For instance, the code in one highly industrialized State says in connection with circular saws that each saw must have "a guard over the saw, a spreader located at the rear of the saw, a guard under the table."

In addition to actual conflict or vagueness in requirements, there is considerable variation in acceptance standards and practices on the part of many State agencies. This exceedingly serious situation includes both the listing of "approved devices" by the few States that have official approval agencies and, what is more serious, the standards the inspection services of the various States use as a guide in their orders and recommendations to industry. A very few States issue fairly definite written instruction manuals to their inspectors; most do not, so that a machine or guard accepted in one State may require changing in a neighboring State. In some cases this has occurred in different districts



in the same State. And, of course, the practical result of all this is that if a manufacturer wished to produce for general sale a fully safeguarded standard model (of a circular saw, for instance) he would have to contact pretty nearly every State regulatory agency and secure design approval.

Action on the part of three groups has already been started to clear up this situation. First, the International Association of Government Labor Officials at its annual convention this fall went on record urging member States to adopt uniform machine guarding specifications. Second, the American Society of Safety Engineers has hard at work a Committee on Built-In Safety developing the detailed design specifications for hazardous machines. Third, the American Standards Association is opening up for review and revision many of its machinery codes to make possible the incorporation of up-to-date Built-In Safety specifications.

But as worthy as these efforts are, the cause will not be won until that loudest voice of all—the voice of consumer demand, makes itself heard. If and when you, the user, really want safety built into the machines you buy, you'll find the obstacles which now loom large disappearing.

DERMATITIS

(Continued from page 22)

taken at the completion of the day's work, and change to clean, dry street clothing. Often it is desirable to use a bland ointment, both before work, as a protective device, and after washing, to sooth the skin and to replace certain oils lost in washing.

Washing must be done completely and carefully, and the hands should be dried thoroughly. Common towels are to be discouraged. Upon the soap used and the towels provided depends much of the efficacy of washing. Many industrial plants have found paper towels, easily accessible in metal cabinets, to be ideal for this purpose. They are not expensive, and are absolutely hygienic. By all means, avoid the common towel. It is not only conducive to permitting the development of dermatitis, but encourages the spread of many other infectious conditions.

Lockers should be provided with two compartments—one for work clothes, and another for clean street clothes. Even better, two locker rooms each, opening into the shower room, provide complete change from hazardous substances. It is obvious, but worth emphasis, that wearing work clothing after work permits prolonged contact with irritants, or with fumes thereof. Such further exposure to irritants is to be discouraged.

Workers in the metal compounds discussed must watch their health, have periodic health examinations, report and have treated, immediately, any breaks in the skin surface.

A further precaution required is that work rooms be kept as clean as possible. Non-absorptive floors are desirable, and frequent cleaning of floors and walls, with water or vacuum systems, or both, is desirable.

The essence of dermatitis prevention and control is in keeping irritating substances away from the skin, or minimizing the effects after exposure above are for this purpose.

LIGHTING

(Continued from page 9)

Reflectors and Projector Lamps

Proper reflector and projector lamps are made with specially shaped bulbs, on the inside surface of which is deposited a highly efficient reflecting surface. The reflector lamps are made of blown glass and are suitable for interior use only.

The projector lamps are made of molded glass and are more rugged in construction. Both types of lamps are available in either a spot or flood lamp. The spot lamps produce a strong narrow beam of light useful for applications where it is necessary to supplement the general lighting with a higher level of illumination over a restricted area, and the nature of the machine or operation is such that the usual type of local lighting reflectors, mounted close to the work, cannot be used. The flood lamps fill a similar application where a larger area is to be lighted and a wider beam spread is therefore desired. Adjustable sockets are available which make it possible to direct the beam in any desired direction. Always there is the advantage of simplicity, since the lighting installation is reduced to the simple problem of providing an appropriate outlet and properly directing the lamp.

This simplicity of installation makes the lamps particularly well suited for the lighting of temporary construction work, loading platforms and other locations where night work is occasionally performed. They are also suitable for spotlighting signs, dangerous spots or any location in the factory where a high level of illumination is needed over restricted area.

(To be concluded next month)

CARBON MONOXIDE

(Continued from page 18)

a. Have appliances installed by competent persons.
b. Use appliances made only by a reputable manufacturer, avoid worn out and second-hand equipment.
c. Have appliances inspected regularly, have both appliance and connections repaired at the first sign of leakage.

(8) Garages:

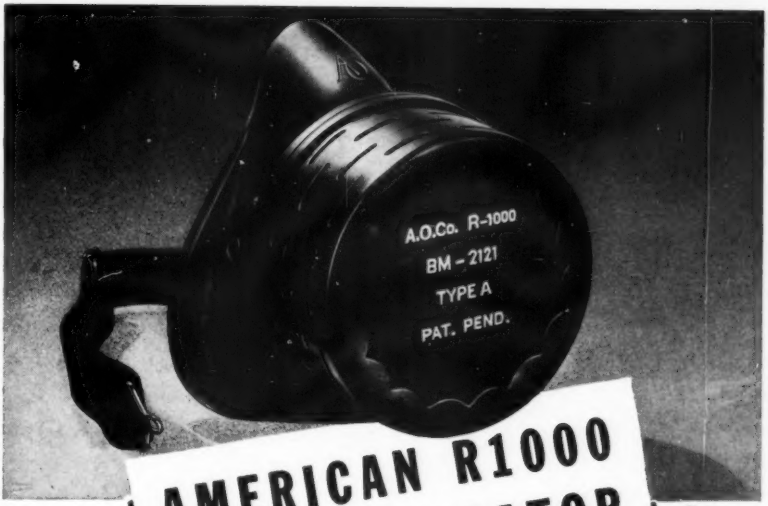
a. Install a ventilating system for the work room as a whole, or arrange for removal of exhaust gas direct from exhaust pipe of car.
b. Do not allow an automobile to run for more than 30 seconds in a closed room, unless there are extraordinary ventilating facilities.

(9) Provide adequate general ventilation for all work rooms.

It is recommended that workers likely to be exposed to carbon monoxide have a thorough physical examination, including blood count and hemoglobin determination, before undertaking work, at least once a year thereafter, and any workers with anemia, or any other chronic disease should not work where exposure to carbon monoxide is likely.

Remember that acute carbon monoxide poisoning comes quickly, often without any warning intelligible to the average workman, and death can follow rapidly. Chronic poisoning can develop to an advanced stage if not diagnosed and treated properly.

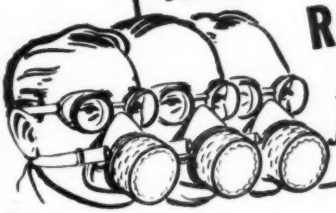
The preventive measures outlined above are an absolute *must* for management operating combustion appliances likely to produce carbon monoxide.



AMERICAN R1000 RESPIRATOR

fits any face

Pats. Pending



Face-mask of pliable, non-irritating rubber is designed to fit any face *comfortably.* Cantilevered face-contacting edges of the mask provide a *double* airtight seal. Adjustable one-piece headband (*or new double headband*) holds the mask snugly, but not too tightly, against face. Day-long comfort and safety are assured.

The American R1000 Respirator also features the special long-lived, clog-resistant filter cartridge . . . the inhalation valve and twin exhalation valves that make breathing safe and easy. Plus new compactness, light weight, and unobstructed visibility with or without goggles. *Write for Bulletin TL 119.*

APPROVED FOR TYPE A DUSTS BY U. S. BUREAU OF MINES

AMERICAN OPTICAL COMPANY

Manufacturers, for more than 100 years, of products to aid and protect vision. Factories at Southbridge, Mass. In Canada, Consolidated Optical Co., Ltd. Branch offices in all principal industrial centers

vidual rather than collective pressure upon the manufacturers of machines to adequately guard their machines at the time of their manufacture. The time has not yet come when the manufacturer of a woodworking machine can say, "Apparently the majority of our customers want completely guarded machines—We can't go on building two models, one guarded and the other unguarded, so let's sell nothing but the type our best customers want."

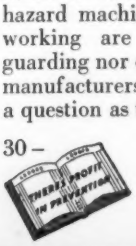
I think every safety engineer will agree that the manufacturers of machines are in a better position than anyone else to design and guard them for the maximum in safety and efficiency. Design is of such vital importance to safety that certain machines, as for instance the ordinary circular (table) saw, cannot be properly guarded unless the machine and the guarding are designed for each other. As to the added cost, I could cite many examples proving that a satisfactory guarding job built into a standard model does not cost over half as much as similarly effective guards (if equal effectiveness is possible at all) added later.

Code Complications

Why, then, aren't more machine builders including safety as standard equipment? Although much has been and is being done by manufacturers of machinery to increase their safety and operation and many excellent examples of designed-in and built-in safety could be cited, the fact remains that most of the commonly used high-hazard machines in wood and metal working are neither designed for guarding nor offered guarded by their manufacturers. The typical answer to a question as to why this is so is, "It's a matter of customer demand, for one thing but, more important, we cannot include guards as parts of standard models, for what one State will accept another may not. In fact, the requirements of most States are so general or incomplete that we don't know what is wanted. Give us definite specifications and we will meet them."

Some preliminary studies we have made indicate that, while some serious conflicts in State codes and regulations do exist, they are not very numerous. Those that do present quite an obstacle. For instance, the Pennsylvania code on circular saws *requires* the hood over the saw to be mounted on the spreader, while several other leading States do not and, in fact, prefer it separately mounted. But vagueness is still the principal characteristic of many State code and statutory requirements. For instance, the code in one highly industrialized State says in connection with circular saws that each saw must have "a guard over the saw, a spreader located at the rear of the saw, a guard under the table."

In addition to actual conflict or vagueness in requirements, there is considerable variation in acceptance standards and practices on the part of many State agencies. This exceedingly serious situation includes both the listing of "approved devices" by the few States that have official approval agencies and, what is more serious, the standards the inspection services of the various States use as a guide in their orders and recommendations to industry. A very few States issue fairly definite written instruction manuals to their inspectors; most do not, so that a machine or guard accepted in one State may require changing in a neighboring State. In some cases this has occurred in different districts



in the same State. And, of course, the practical result of all this is that if a manufacturer wished to produce for general sale a fully safeguarded standard model (of a circular saw, for instance) he would have to contact pretty nearly every State regulatory agency and secure design approval.

Action on the part of three groups has already been started to clear up this situation. First, the International Association of Government Labor Officials at its annual convention this fall went on record urging member States to adopt uniform machine guarding specifications. Second, the American Society of Safety Engineers has hard at work a Committee on Built-In Safety developing the detailed design specifications for hazardous machines. Third, the American Standards Association is opening up for review and revision many of its machinery codes to make possible the incorporation of up-to-date Built-In Safety specifications.

But as worthy as these efforts are, the cause will not be won until that loudest voice of all—the voice of consumer demand, makes itself heard. If and when you, the user, really want safety built into the machines you buy, you'll find the obstacles which now loom large disappearing.

DERMATITIS

(Continued from page 22)

taken at the completion of the day's work, and change to clean, dry street clothing. Often it is desirable to use a bland ointment, both before work, as a protective device, and after washing, to sooth the skin and to replace certain oils lost in washing.

Washing must be done completely and carefully, and the hands should be dried thoroughly. Common towels are to be discouraged. Upon the soap used and the towels provided depends much of the efficacy of washing. Many industrial plants have found paper towels, easily accessible in metal cabinets, to be ideal for this purpose. They are not expensive, and are absolutely hygienic. By all means, avoid the common towel. It is not only conducive to permitting the development of dermatitis, but encourages the spread of many other infectious conditions.

Lockers should be provided with two compartments—one for work clothes, and another for clean street clothes. Even better, two locker rooms each, opening into the shower room, provide complete change from hazardous substances. It is obvious, but worth emphasis, that wearing work clothing after work permits prolonged contact with irritants, or with fumes thereof. Such further exposure to irritants is to be discouraged.

Workers in the metal compounds discussed must watch their health, have periodic health examinations, report and have treated, immediately, any breaks in the skin surface.

A further precaution required is that work rooms be kept as clean as possible. Non-absorptive floors are desirable, and frequent cleaning of floors and walls, with water or vacuum systems, or both, is desirable.

The essence of dermatitis prevention and control is in keeping irritating substances away from the skin, or minimizing the effects after exposure above are for this purpose.

LIGHTING

(Continued from page 9)

Reflectors and Projector Lamps

Proper reflector and projector lamps are made with specially shaped bulbs, on the inside surface of which is deposited a highly efficient reflecting surface. The reflector lamps are made of blown glass and are suitable for interior use only.

The projector lamps are made of molded glass and are more rugged in construction. Both types of lamps are available in either a spot or flood lamp. The spot lamps produce a strong narrow beam of light useful for applications where it is necessary to supplement the general lighting with a higher level of illumination over a restricted area, and the nature of the machine or operation is such that the usual type of local lighting reflectors, mounted close to the work, cannot be used. The flood lamps fill a similar application where a larger area is to be lighted and a wider beam spread is therefore desired. Adjustable sockets are available which make it possible to direct the beam in any desired direction. Always there is the advantage of simplicity, since the lighting installation is reduced to the simple problem of providing an appropriate outlet and properly directing the lamp.

This simplicity of installation makes the lamps particularly well suited for the lighting of temporary construction work, loading platforms and other locations where night work is occasionally performed. They are also suitable for spotlighting signs, dangerous spots or any location in the factory where a high level of illumination is needed over restricted area.

(To be concluded next month)

CARBON MONOXIDE

(Continued from page 18)

a. Have appliances installed by competent persons.
b. Use appliances made only by a reputable manufacturer, avoid worn out and second-hand equipment.
c. Have appliances inspected regularly, have both appliance and connections repaired at the first sign of leakage.

(8) Garages:

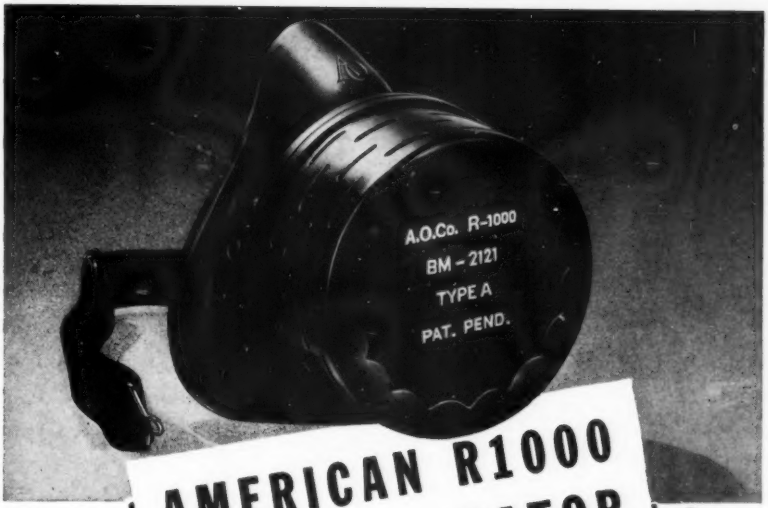
a. Install a ventilating system for the work room as a whole, or arrange for removal of exhaust gas direct from exhaust pipe of car.
b. Do not allow an automobile to run for more than 30 seconds in a closed room, unless there are extraordinary ventilating facilities.

(9) Provide adequate general ventilation for all work rooms.

It is recommended that workers likely to be exposed to carbon monoxide have a thorough physical examination, including blood count and hemoglobin determination, before undertaking work, at least once a year thereafter, and any workers with anemia, or any other chronic disease should not work where exposure to carbon monoxide is likely.

Remember that acute carbon monoxide poisoning comes quickly, often without any warning intelligible to the average workman, and death can follow rapidly. Chronic poisoning can develop to an advanced stage if not diagnosed and treated properly.

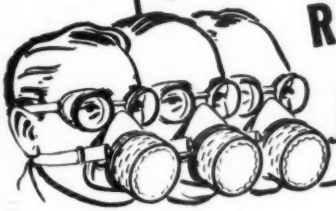
The preventive measures outlined above are an absolute *must* for management operating combustion appliances likely to produce carbon monoxide.



AMERICAN R1000 RESPIRATOR

fits any face

Pats. Pending



Face-mask of pliable, non-irritating rubber is designed to fit any face *comfortably.* Cantilevered face-contacting edges of the mask provide a *double* airtight seal. Adjustable one-piece headband (*or new double headband*) holds the mask snugly, but not too tightly, against face. Day-long comfort and safety are assured. The American R1000 Respirator also features the special long-lived, clog-resistant filter cartridge . . . the inhalation valve and twin exhalation valves that make breathing safe and easy. Plus new compactness, light weight, and unobstructed visibility with or without goggles. *Write for Bulletin TL 119.*

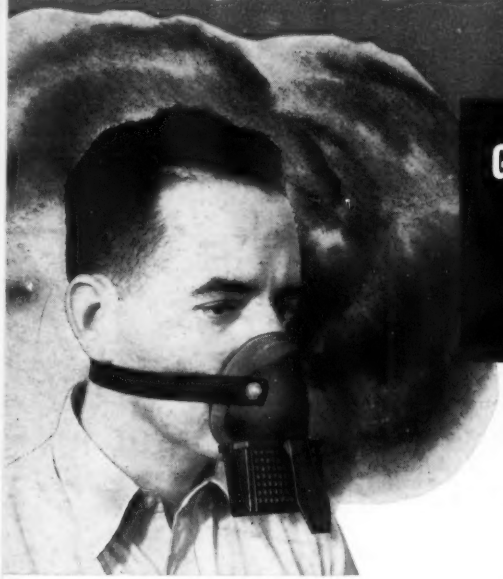
APPROVED FOR TYPE A DUSTS BY U. S. BUREAU OF MINES

AMERICAN OPTICAL COMPANY

Manufacturers, for more than 100 years, of products to aid and protect vision. Factories at Southbridge, Mass. In Canada, Consolidated Optical Co., Ltd. Branch offices in all principal industrial centers

THE New Dustfoe RESPIRATOR

APPROVED BY U. S. BUREAU OF MINES
(Approval Nos. 2115 and 2126)



GENUINELY IMPROVED IN DESIGN AND COMFORT!

- ★ **LIGHTWEIGHT**—total weight complete, 3¾ ounces
- ★ **COMPACT**—full vision in every direction, no interference with goggles or any head covering
- ★ **LOW BREATHING RESISTANCE**—has large filter, compactly folded.
- ★ **EASY TO MAINTAIN**—all parts, including rubber face-cushion easily replaceable; may be completely sterilized.
- ★ **FOOLPROOF EXHALATION VALVE**—U. S. Army Gas Mask-type—most positive, leak-proof valve ever designed—provides drainage when necessary.
- ★ **PROTECTIVE FILTER COVER**—prevents contamination of filter by grease and dirt from hands and equipment.

These outstanding features are combined with U.S. Bureau of Mines approved protection against pneumoconiosis-producing dusts, whether dry or supported in water mist. Toxic Dust Model also available, approved for such dusts as lead, cadmium, arsenic, manganese, etc. Write for Bulletin CM-3.

1914—25 YEARS OF SAFETY PROGRESS—1939

MINE SAFETY APPLIANCES COMPANY

Braddock, Thomas and Meade Streets, Pittsburgh, Pa.

District Representatives in Principal Cities

M.S.A. Products include Breathing Apparatus . . . Inhalators . . . Comfo Respirators . . . Masks of all Types . . . Gas Indicators . . . Gas Detectors . . . Safety Goggles . . . Protective Hats and Caps . . . Edison Electric Cap Lamps . . . Safety Belts . . . Safety Clothing . . . First Aid Equipment. Descriptive Bulletins on request.